REMARKS

Reconsideration and allowance are respectfully requested in light of the preceding amendments and following remarks. No claims having been cancelled and claim 39 having been added by this response, the Applicants respectfully submit that 22 claims, specifically claims 1-18 and 36-39, of which claims 1, 36 and 39 are independent, remain pending and properly under consideration in this application. The Applicants note that the claims designated in the last response as claims 19-21 have been renumbered as claims 36-38 to reflect the earlier presentation and subsequent cancellation of claims 19-35.

Claims 1, 3 and 36 have been amended to provide for the uniform use of the term "nanowire" to describe the conductive fibers included in the claimed device and reflect the antecedent terminology. The amendments to claims 17 and 18 are amended to distinguish between the ferri/ferromagnetic and paramagnetic coating structures as detailed in the Specification at, for example, pages 14-15. Claims 37 and 38 have been amended solely to reflect the proper dependent relationship with claim 36. New claim 39 is directed to particular embodiments of the composite material and coating as disclosed in the Specification at pages 10-11. The Applicants respectfully submit, therefore, that claim 39 is fully supported by the original specification and does not constitute new matter.

Objection to the Specification

The TITLE of the invention stands objected to as not sufficiently descriptive. The Applicants respectfully submit that the amendment to the TITLE reflected above, by

removing any reference to the non-elected method claims, results in a title that clearly indicates the invention to which the current claims are directed. The Applicants, therefore, respectfully request that this objection be withdrawn.

35 U.S.C. § 103(a) Rejections Based On XU And MOSKOVITS References

Claims 1, 2, 4, 5, 9-12, 15 and 16 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Pat. No. 5,973,444 to Xu et al. ("Xu") in view of U.S. Pat. No. 6,129,901 to Moskovits et al. ("Moskovits"). The Applicants respectfully traverse this rejection.

The Applicants respectfully submit that as described by Xu, FIG. 1 illustrates a device 10 in which carbon fiber emitters 20 are grown catalytically from the surface of a patterned metal catalyst film 14. Contrary to the assertion, Action at 2, the Applicants respectfully contend that there is no teaching or suggestion in the cited portions of Xu that the metal catalyst film surface is a "composite material" that incorporates carbon fibers as taught in the present application.

The Applicants also respectfully maintain that Xu's disclosure that catalytically grown fibers may "contain" catalyst materials, is insufficient to support the conclusion that produce even a partial "coating" of the final carbon fibers. Indeed, the Applicants respectfully contend that the term "coating" requires a "thin layer" on a substrate and that a catalyst particle found at the end of a carbon fiber cannot, under any reasonable interpretation, constitute a "coating" as that term is used in the present application. Col. 9, lines 49-51.

The Applicants also respectfully submit that as used in the present application and claims, the term "protrude" refers to that portion of the claimed nanowires that are not incorporated into the composite material. The Applicants maintain that in Xu no portion of the carbon fibers 20 are incorporated into the patterned metal catalyst film 14 or any underlying layer and thus do not "protrude" from a composite material as required by claim 1. The Applicants respectfully contend that Xu's preference for carbon fibers having an aspect ratio of more than 4 does not remedy this deficiency.

The Applicants respectfully contend that Moskovits discloses the growth of carbon nanotubes from catalysts provided within pores arranged in an alumina template. The Applicants respectfully contend that Moskovits' alumina template insulates adjacent carbon nanotubes and maintains the separation and alignment of the carbon nanotubes in a manner that prevents nanotube-to-nanotube contact. The Applicants thus submit that, as taught by Moskovits, the nanotubes are not "electrically connected" as required by claim 1.

The Applicants also respectfully submit that it is unclear how one of ordinary skill in the art would be motivated to combine the Xu and Moskovits references in the manner suggested, Action at 3, or indeed, exactly what the intended structure would be or how such a combination could be accomplished with a reasonable expectation of success. The Applicants respectfully contend, therefore, that this rejection is not supported by the necessary "convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Indeed, the Applicants respectfully contend that one of ordinary skill would have no motivation to combine Xu,

in which nanotubes are grown from a substantially planar surface, and Moskovits, in which nanotubes are grown in separate pores provided in an insulating template.

With respect to claim 2, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references are equally applicable to dependent claim 2 and are incorporated by reference. The Applicants respectfully contend that the material differences noted between the claimed invention and the actual teachings of the cited references are not overcome by Xu's disclosure of field emission devices in which the carbon fibers comprise a portion of the electron emitter structure.

With respect to claims 4 and 5, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references are equally applicable to dependent claims 4 and 5 and are incorporated by reference. As noted above, the Applicants respectfully contend that the cited references fail to teach or suggest any external "coating" of the carbon fibers. The Applicants respectfully contend that the Examiner has identified no basis for finding the magnetic material content comprises a *result-effective variable* suitable for optimization. Indeed, it is the Applicants' position that nothing in the cited references would have led one of ordinary skill to coat the exterior of the carbon fibers with *any* magnetic material, let alone select the claimed volume percent ranges.

Absent identification of a particular parameter as a result-effective variable, *i.e.*, a variable which achieves a recognized result, there can be no "routine" experimentation to determine the optimum or workable ranges of that variable. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). The Applicants respectfully contend, therefore, that the

material differences noted between the claimed invention and the actual teachings of the cited references cannot be overcome by "routine experimentation."

With respect to claim 9, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references are equally applicable to dependent claim 9 and are incorporated by reference. As noted above, the Applicants respectfully contend that the cited references fail to teach or suggest any "protruding" of the carbon fibers from a composite material. The Applicants respectfully contend that the Examiner has identified no basis for finding the percentage variation in the protrusion height comprises a *result-effective variable*. As noted above, absent such a finding, the assertion of "routine experimentation" for meeting a claim limitation not found or suggested in the prior art references is inappropriate.

With respect to claim 10, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references are equally applicable to dependent claim 10 and are incorporated by reference. As noted above, the Applicants respectfully contend that the cited references fail to teach or suggest any "composite material" as that term is used in the present application and claims. In particular, the Applicants respectfully contend that the catalyst metal film 14 of Xu does not comprise a "composite material" incorporating carbon nanowires.

With respect to claim 11, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references and the arguments specific to claim 2 are equally applicable to dependent claim 11 and are incorporated by reference. The Applicants respectfully contend that the material differences noted between the claimed invention and the actual teachings of the cited references are not overcome by

Xu's disclosure of field emission devices in which the carbon fibers comprise a portion of the electron emitter structure.

With respect to claim 12, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references and the arguments specific to claims 2 and 11 are equally applicable to dependent claim 12 and are incorporated by reference. The Applicants respectfully contend that the material differences noted between the claimed invention and the actual teachings of the cited references are not overcome by Xu's disclosure of field emission devices in which the carbon fibers comprise a portion of the electron emitter structure with an apertured grid.

With respect to claim 15, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references are equally applicable to dependent claim 15 and are incorporated by reference. The Applicants respectfully contend that the material differences noted between the claimed invention and the actual teachings of the cited references are not overcome by Xu's disclosure that the nanowires may be carbon.

With respect to claim 16, the insufficiencies detailed above regarding the proposed combination of the Xu and Moskovits references are equally applicable to dependent claim 16 and are incorporated by reference. The Applicants respectfully contend that the material differences noted between the claimed invention and the actual teachings of the cited references are not overcome by Xu's disclosure that the carbon fibers may contain some quantity of the metal catalysts. The Applicants respectfully maintain that there is no teaching or suggestion in Xu that the catalyst metal comprises

even a partial coating of the nanofiber or that the catalyst metals are "inside" the nanotube, Action at 5, rather than at the tip of the carbon fiber.

The Applicants, therefore, respectfully request that these rejections be withdrawn.

35 U.S.C. § 103(a) Rejections Based On XU, MOSKOVITS And KANE References

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Xu, in view of Moskovits and further in view of U.S. Pat. No. 5,191,217 to Kane et al. ("Kane"). The Applicants respectfully traverse this rejection.

With respect to claims 13 and 14, the deficiencies detailed above regarding the proposed combination of the Xu and Moskovits references are equally applicable to dependent claims 13 and 14 and are incorporated by reference. The Applicants respectfully maintain, however, that Kane is insufficient to remedy the noted deficiencies of the proposed combination of Xu and Moskovits.

The Applicants, therefore, respectfully request that this rejection be withdrawn.

Allowable Subject Matter

The Applicants note with appreciation the Examiner's indication that claims 36-38 are allowed and that claims 3, 6-8 and 17-18 would be allowable if rewritten in independent form.

CONCLUSION

All rejections having been addressed and overcome, the Applicants respectfully contend that the present application is now in condition for Allowance and a Notice to that effect is earnestly solicited.

Should the Examiner feel that further discussion on any point would be helpful in advancing the prosecution of this application, the Examiner is respectfully requested to contact the undersigned at the Examiner's earliest convenience.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to credit any overpayment or charge any underpayment of fees due pursuant to 37 C.F.R. §§ 1.16 or 1.17 to Deposit Account No. 08-0750.

Respectfully submitted,

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